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ABSTRACT

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VOCAL ACTIVITY, TIME PRESSURE AND INTERPERSONAL JUDGEMENTS

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Abstract

This study examined the effects of differential time pressures on small group members' rankings of one another based upon vocal activity. Vocal activity was operationalized as observed frequency of interaction. Time pressure was manipulated by allowing either six minutes or no time limit on a group problem solving task.

Main effects were hypothesized for vocal activity on all interpersonal judgements. These judgements were perceived competence, composure, extroversion, sociability, task, physical and social attraction, attitude, value, appearance and background homophily heterophily, power, listening, understanding and quality of communication. In addition it was hypothesized that the relationship between time and vocal activity would significantly affect interpersonal ratings.

Utilizing two definitions of high and low vocal activity, hypothesized main effects were found for power, quality, extroversion, value, appearance and attitude homophily. Corollary hypotheses concerning time pressure and judgements were supported for social attraction, value and appearance homophily.

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VOCAL ACTIVITY, TIME PRESSURE AND INTERPERSONAL JUDGEMENTS

Extensive but largely ignored research on vocal activity has indicated that it serves as a powerful mediating variable in interpersonal interactions. Vocal activity is defined as the duration and frequency of an individual's speech participations. It has been referred to in part by several labels including: verbal intensity (96), productivity (107), talkativeness (64) and interaction rate (130). The research suggests that many interpersonal judgements tend to be based largely on how often someone talks rather than what he says.

Chronemic variables have seldom received the attention of communication scholars. Philosophers, historians and other social scientists have, in a limited number of cases, observed temporal patterns and their effects. Yet time has always played an exceedingly important part in human interaction. In daily situations time is obviously a limiting or extenuating factor.

The limitation that time places on an individual may affect how he or she perceives others in interactions. As people spend more time together and feel relatively less time pressure, it is possible that their perceptions of others changes. Support for such a perspective comes from a number of research efforts (5,23). Not only is it likely that perceptions of others change, but also the bases on which those perceptions are made change. As individuals interact more, with less time pressure, it would be reasonable to suggest that they go beyond the quantity of talk (i.e., vocal activity) and start to examine the quality of their interaction as their perceptual reference. It is the intent of this study to examine the interaction between the duration permitted for interaction and the interpersonal judgements that might be mediated by variances in vocal activity.

Review of Related Literature

Consistency of Vocal Activity. Reports from many researchers have indicated that individuals have a relatively high degree of stability with respect to their levels of vocal activity (9,10,24,64,73,83,97, 121). Each individual, it seems, has a generally consistent pattern of such activity. In the development of the interaction chronograph, an often used device to measure vocal activity, Chapple (30,31) noted a consistent and invariant relationship in the frequency of an individual's talk regardless of setting or the individuals with whom the person was interacting. Goldman-Eisler (59) found a similar consistency, but reported an even greater stability in silence patterns.

While there is a high degree of consistency in the amount an individual talks, some fluctuations in an individual's level of activity can and do occur. Reports have related changes in activity levels to anxiety (37,42,49,53,76,77,108,106,110,119,124,125), reinforcement (1,2,11,18, 35,36,50,69,80,92,100,101,113,122,123,127,128,129), nonverbal cues (24), organization and order of discussion (23,70,101,107), size of the

interacting group as well as the interaction rate of other members (102,127,140), the intimacy of the topic (75,94,108,139), the individual's status in the group (132), the assignment of a particular type of leader (19) and the presence of an interviewer or non-group leader (44). Each of these variables have been found to account for some variations in the normal level of vocal activity.

Insofar as there is a generally consistent rate of vocal activity for an individual it would be expected that this level would affect the perceptions others have of him or her (32,34). In particular three major areas of interpersonal judgements have been closely examined by researchers in relation to an individual's level of activity. They are perceived status and liking, perceived leadership and influence, and perceived quality of contributions.

Perceived status and liking. There appears to be a linear relationship between an individual's perceived status and the amount of talking that he or she does in a group. Such a relationship has been noted by a large number of researchers (6,16,18,27,64,99,107,127,130,135,139). One might view this relationship as an extension of the finding that higher amounts of social interaction generally enhances the attitudes of interactors towards each other (26,54,68,98).

Another arae of research that relates to the vocal activity-status relationship is that concerned with the frequency of stimuli exposure. Consistent findings utilizing a number of stimuli suggest a logrithmic relationship between the frequency of stimuli exposure and the affective ratings of the stimuli (20,62,74,136,144,146,147). For example, Becknell, Wilson and Baird (20) manipulated the frequency of slides of nonsense syllables and subsequently asked their subjects to select some 'brand' of nylon stocking to buy. Each brand was labeled with one of the nonsense syllables. There was a distinct tendency on the part of the subjects to select stockings that were labeled with the more frequently exposed stimuli syllable. While this report offers some verification for the behavioral effects of stimuli exposure, recent work by Swap (137) attempting to extend this research to an attitude change model failed to replicate the effects. In this case both the topic and the source of the message were manipulated and neither was found to have an effect.

While the relationship between status and vocal activity appears to be linear, some suggestion has been made that it becomes curvilinear at some extremely high point of vocal activity. That is, as an individal's level of vocal activity exceeds some optimal level, the individual's perceived status will start to decrease (6,12,13,14,64,65,131). Argyle views this excessive output as an "overpowering bombardment" that will result in overt or covert withdrawal by other members away from the high talker through either rejection of that individual or ignorance of his actions. Hayes and Meltzer (64) suggest such an inverted U relationship when the highest ranked member of a group is the one who talks an above average, but not excessive amount of time. Maddi (85) proposed that optimal levels of exposure may be intermediate rather than high or low levels. Heston's (67) research on ideal source

credibility offers some support for the nonlinear relationship. Her findings indicate that the ideal source of communication ought to be moderate to neutral in terms of perceived extroversion. In subsequent work by Daly, McCroskey and Richmond (41) extroversion was found to be highly related to vocal activity. Stang (131) furthers the suggestion of curvilinearity. He varied the length of taped messages and found a curvilinear relationship between length of messages and liking for the source.

Archer (7) has recently reported that physical attractiveness and vocal activity are negatively related. However, his measurements of both physical attractiveness and activity were extremely weak. The attraction measure was determined by ratings made by observers of a short videotape of the individual while the activity was measured by asking instructors their general impressions of the individual's activity. Daly, McCroskey and Richmond (41) found evidence contrary to that reported by Archer (7). In their study three components of interpersonal attraction (task, social and physical) were positively related to levels of vocal activity. People were regarded as more attractive as they talked more up to the point where they were interacting about fifty percent of the total time in a described hypothetical group. In this research the only information respondents had on the talker was the amount talked and the individual's sex.

Perceived leadership and influence. In addition to status and liking vocal activity has been found to be strongly related to perceived leadership. Willard and Strodtbeck (142) suggest that this relationship is "one of the most consistent findings in the small group literature (p. 161)." A plethora of research supports this relationship (2,12,13 14,15,16,17,18,27,29,38,57,63,64,70,71,78,79,86,120,131,148). The relationship has been demonstrated by both the use of group member and observer evaluations of leadership as data.

A corollary to these findings has been the relationship observed between the amount of talking and an individual's perceived influence in a group or social setting. Very simply, the more one talks, the more he or she is perceived as being influential (6,70,114,131,134,142). Argyle (6) summarizes many studies by concluding that: "A will persuade B, rather than vice versa, if he talks more..." A high talker had a much better chance of getting his or her solution accepted regardless of it's correctness or quality than did a low talker in a study reported by Riecken (114). To get a solution accepted, the low talker needed the overt support of the high talker.

Daly, McCroskey and Richmond (41) examined leadership-influence and it's relationship to vocal activity through the use of hypothetical descriptions of individuals with varying levels of vocal activity. Utilizing credibility scales that operated in five dimensions as well as measures of power-influence suggested by Lashbrook (81) they observed linear relationships between vocal activity and four dimensions of peer credibility (composure, extroversion, sociability and competence) as well as power-influence

Attributions of quality contributions. Generally quality of contributions made by different members of a group are associated highly with each members' vocal activity. Jaffee and Lucas (70), Jaffee, Richards and MacLaughlin (71) and Riecken (114) have all determined that the length one talks is a major predictor of whether an individual will be associated by other group members with quality contributions. Similar perceptual evidence comes from a study by Daly, McCroskey and Richmond (40) which used hypothetically described individuals with varying levels of activity. Respondents indicated that the higher the level of activity, the higher the ratings assigned to perceived quality of contributions. It seems that members of a group often have difficulty distingushing the quality from the quantity in terms of contributions. When in doubt, past research suggests that individuals tend to base their decisions on quantity.

When asked to estimate the relative participation made by an individual in a group, members tended to underestimate the number of contributions made by low talkers and overestimate the amount offered by high talkers (72,114).

Temporal duration. The role time plays in human interaction is a relatively unexplored variable in the behavioral sciences. While general literature on such areas as the philosophy of time, psychological orientations towards time and the general patterning of time have intrigued numerous scholars (46,56), empirical investigations of temporal duration and their associated effects have not been within the mainstream of scientific curiosity (3). In the small group literature this paucity of interest in the behavioral correlates of differing time durations has been noted (48). Ironically, it has been suggested (149) that variations in temporal durations and changes in time pressure may serve as a major confounding variable in research.

Available research has indicated that variations in temporal duration may result in a number of behavioral and personality changes in groups and their members. Specifically, over time group members tend to exhibit lower levels of anxiety about group participation (38), more role specialization (130), reduced feelings of social pressure to change or modify one's point of view (21), more familarization with the topic of discussion and the values associated with the topic (21) and consequently more freedom in their interaction (20). The longer individuals interact, the less similarity in their personalities will serve as predictors of interpersonal attraction (115). Personality differences over time come to take on less importance due to a process that might be termed "social adjustment." Individuals start to adjust to one another and the environment they are interacting within (22,37). The longer the life of a group, the greater the leadership emergence and the more affective bonds between members become both obvious and important (21).

In relation to the interaction itself, research suggests that groups lasting longer tend to be more willing to engage in open conflict than

shorter term groups which generally have a higher predisposition towards conflict avoidance (60). Indeed, as members engage in more extended interactions they become more interested in the group activity and product (21) and consequently tend to have higher quality judgements (138) due to better overall decision making (60). Members also have a greater degree of consesnsu with respect to such judgements given greater time (138).

Placing time limits on interacting groups tends to result in a higher sense of pressure on the part of group members (103,111,117,126,133). Not only will the limitation on duration produce pressure but also, as the time allocated approaches finality, the pressure will increase (111,133).

Siipola, Walker and Kolb (126) varied the time pressure on individuals and found that when there was high pressure a strong selective effect occured, Increased time pressure tended to stop subjects' associative processes at a relatively early stage resulting in a more simple identification than was expected in the normal time pressure setting. When a subject experienced high time pressure he "automatically limited his associations do the type that came most quickly (p. 445)."

Under such pressure subjects demonstrated "stimulus bound, superficial, verbal type associations...without penetrating deeply into the essential idea behind the stimulus (p. 446)." Under conditions that did not limit time, subjects displayed more independence of choice. When later asked about the experience subjects without the time pressure indicated they felt a "sense of personal responsibility for the meaningfulness and quality of the product (p. 458) that they did not feel when under the timed condition. Similar reports on these effects can be found in research on negotiation procedures by Pruitt and Drews (111) and Stevens (133). Both studies indicate that when there is high time pressure, there are more attempts at a safer approach to a particular problem with lower levels of demand and less bluffing.

Under high time pressure individuals will generally be less fluent and less able to coordinate their verbal behavior with others. This effect may be due in part to reduced dependence upon other group members for some guage of timing and patterning of interaction (88). The anxiety aroused by increased time pressure (37) tends to lead to greater initial agreement between group members as well as greater stability of decisions over time (58). With more time allowed they suggest that there is greater potential for interaction and less pressure which results in less overall resentment and rejection of the group by members. Indeed with low time pressure members appear to be more willing to accept the group decision.

Through the manipulation of different time pressures Pepinsky, Pepinsky and Pavlik (103) compared productivities while holding the task level constant. Their findings indicated a curvilinear relationship between the amount of time pressure and group productivity. It seems that the optimum level for productivity is one invloving only a moderate amount

of time pressure. Similar findings have been reported by Aronson and Gerard (8) who reported that individuals tend to fill up time allocated to them, regardless of the difficulty of the task. They concluded:

> Thus to go beyond Parkinson's law, not only does work expand to fill the time available but once it has expanded it continues to require excessive time---even when it is not readily available (p. 339).

Boag (25) found that the average student did better on vocabulary tests when there was no restriction on the amount of time available to complete the examination. Sarason, Mandler and Braighill (117) noted that highly anxious individuals performed less well under time limitations while generally low anxious individuals improved their performance. Similar reports by Morris and Liebert (95) suggest that within the timed context (i.e., pressure) highly anxious individuals become inhibited, while there is a facilitating effect on low anxious individuals. In a limited time context, members of a small group (four to five members) indicated to Hare (61) that they had enough time to participate while members of a larger group (size greater than five) with the same time limitations reported less opportunity to participate and greater dissatisfaction with the group.

Butler (28) has recently suggested an interaction between the familarity of an object and the time available to examine it. He demonstartes that when one is familar with some object then it should take an individual less time to process the information contained in it, or about the object. Related to this preceding research one might conclude that by extending the time available for familarization there would be greater opportunity for more extensive information processing of the group interaction and its' components, similar again to the data reported by Siipola, et. al. (126).

Derivation of Hypotheses

The research cited in previous sections of this paper has indicated that individuals who engage in high levels of vocal activity are generally rated higher on a number of interpersonal variables than are those with low levels of activity. Those variables include perceived influence and power, likability, status, interpersonal attraction, credibility, and quality of ideas. Additional research has suggested that individuals with different levels of activity are rated significantly different on the dimensions of homophily-heterophily (41). Other research has suggested that low talkers are rated higher on perceived listening and understanding than are high talkers (40). Some of the experiments in support of such findings have utilized actual group discussions (73,114) while others have operationalized activity on the basis of descriptions of hypothetical group members (40,41,64,65).

Considerable research has indicated that the amount of time allowed for interaction may have significant effects on the evaluation processes occuring during group discussions. For example, allowing greater lengths of time for interaction will result in greater participation by all members of a group (19,116) and consequently makes it harder to isolate one member of a group as the high talker. Generally indiivduals tend to become more comfortable with one another over time and consequently assign certain expectations to individuals (130) based more on the content of interaction than simple first impressions (5,21,122).

Basically previous research indicates that individuals who talk a great deal under what is seen as high time pressure will be rated higher on interpersonal evaluations than will those with low rates of talking. In contrast to high time pressure, group members under low time pressure will begin to look at the content or meaningfulness of the individual's interactions as well as his or her quantity of interaction. It would appear that the only time a group member who interacts very little has a chance to be rated high would be under low time pressure.

Similarly it would appear that in high time pressure situations group members simply would not allow enough time for low talkers to interact sufficiently for any sort of judgements of the merits of the interaction. Likewise the individual under high time pressure who talks first and most will seem to provide some direction to the group about the task. Attributions of leadership, credibility, and most likely attraction should flow from such guidance behavior. All of this points to corollary hypotheses with respect to time pressure: namely that it will be associated in some fashion with the manner in which high and low talkers are evaluated.

From the above:

H_1: Individuals with high vocal activity will receive significantly higher ratings on perceived power-influence than those with low vocal activity.

As a corollary to H_1:

The relationship between vocal activity and perceived power-influence for high talkers will be stronger under conditions of high time pressure than low, whereas for low talkers the relationship between vocal activity and power-influence perceptions will be stronger inder conditions of low pressure than high.

H_2: Individuals with high vocal activity will receive significantly higher ratings on perceived quality of contributions than those with low levels of activity.

As a corollary to H_2:

The relationship between vocal activity and perceived quality of contributions for high talkers will be stronger under conditions of high time pressure than low, whereas for low talkers the relationship between vocal activity and perceived quality will be stronger under conditions of low time pressure than high.

H_3: Individuals with high vocal activity will receive significantly higher ratings on peer credibility dimensions of extroversion, sociability, composure and competence than will those with low vocal activity.

As a corollary to H_3:

The relationship between vocal activity and perceived dimensions of peer credibility for high talkers will be stronger under conditions of high time pressure than low, whereas for low talkers the relationship between vocal activity and perceived credibility will be stronger under conditions of low pressure than high.

H_4: Individuals with high vocal activity will receive significantly higher ratings on interpersonal attraction than will those with low vocal activity.

As a corollary to H_4:

The relationship between vocal activity and interpersonal attraction for high talkers will be stronger under conditions of high time pressure than low, whereas for low talkers the relationship between vocal activity and interpersonal attraction will be stronger under conditions of low time pressure than high.

H_5: Individuals with high vocal activity will have significantly different ratings on the dimensions of heterophily-homophily than those with low vocal activity.

As a corollary to H_5:

The relationship between vocal activity and homophily-heterophily for high talkers will be different under conditions of high time pressure than low.

H_6: Individuals with high vocal activity will be rated significantly lower on perceived listening than will those with low vocal activity.

As a corollary to H_6:

The relationship between vocal activity and perceived listening for high talkers will be stronger under conditions of low time pressure than high, whereas for the low talkers the relationship between vocal activity and perceived listening will be greater under high time pressure than low.

H_7: Individuals with high vocal activity will be rated significantly lower on perceived understanding than will those with low vocal activity.

As a corollary to H_7:

The relationship between vocal activity and perceived understanding for high talkers will be stronger under conditions of low time pressure than high, whereas for low talkers the relationship between vocal activity and perceived understanding will be stronger under high time pressure than low.

Procedures

Subjects. One hundred and thirty three students enrolled in the basic course of a large Eastern University served as subjects in this research. Participation fulfilled a requirement for experimental activity.

Independent Variables

Time pressure: There were two settings involved in this experiment. The manipulation was achieved through instructions read orally to the subjects immediately prior to the actual experiment. In the high time pressure situation subjects were told:

> You have a six minute time limit foryour group discussion. This is because we have found that allowing only six minutes for group interaction will provide enough relevant data for analysis. You should try to reach some solution to the problem in the time allowed. Remember you should reach some group decision in this time.

In the low time setting, subjects were told only that they would "...have as long as you desire to reach some group decision." All other instructions were the same for both time conditions. In addition, in the high time pressure setting the experimenter placed a large clock within the view of the group members, set it to six minutes and provided indications during the six minutes of the remaining time.

Vocal activity: An individual's vocal activity was defined as the frequency of interaction produced. This definition is consistent with much of the previous research. While duration might be considered relevant as well, previous investigations have clearly indicated that duration and frequency are highly related. For example, Bavelas, Hastorf, Gross and Kite (18) found correlations of .94 and .95 between an individual's duration of interaction and his or her frequency of participation. Similarly, Alvord (4) determined correlations between the two approaching .99.

Measurement of the individual's vocal activity was accomplished by means of two trained observers who recorded the frequency of member interaction. All observers completed at least one in-depth training session, while most completed three sessions. The first training session used a frequency based instrument developed by Lashbrook (82). Raters observed in-class discussions with this instrument. Rater reliabilities were approximately .90. A second training session utilized a slightly different type measure but still required raters to note the frequency of interaction. Again all reliabilities were above .90 for all combinations of raters. Since both of the previous sessions had emphasized frequency measures and given the high reliabilities for both sessions, it was expected that the reliabilities of all raters would be sufficient enough for the purposes of this research. However, as a final check,

a third session utilizing the specific instrument used in this research. This instrument was made up of three, four, or five circles depending upon the actual size of the group observed. Lines connected each circle. The observers were told to mark in the appropriate space each time a member of the group talked. The stimuli participants in the third training session were college debaters and their interactions were taped for observation. Raters observed a discussion for two seperate periods, each time noting the interaction. Comparisons were made of frequencies observed by each rater after the first viewing and a question-answer period between the raters and the experimenters had been conducted. Following this another portion of the taped discussion was shown and reliabilities were again assessed. As expected, all reliabilities were again quite high. Estimates for the reliabilities of the trained observers using two at a time were determined via the Spearman-Brown procedure and found to be .96 which was deemed significantly high for the demands of this research. The primary test for the observed vocal activity was based on an operationalization that emphasized the expected frequency of members given different group sizes. In order to be considered high in vocal activity an individual's proportionate level of activity had to be greater than:

$$\text{Expected proportion within group} + \frac{\text{Expected proportion within group}}{n-1}$$

To be classified as low in vocal activity an individual had to be lower than:

$$\text{Expected proportion within group} - \frac{\text{Expected proportion within group}}{n-1}$$

Table 1 provides the values that were necessary to be classified high or low in vocal activity.

Dependent Variables

Peer credibility: A twenty item, five factor measure developed by McCroskey, Jensen and Valencia (89) was utilized to assess the five dimensions of peer credibility: extroversion, sociability, composure, competence and character.

Interpersonal attraction: A fifteen item, three factor measure reported by McCroskey and McCain (90) was used to measure social physical and task attraction.

Homophily-heterophily: A eighteen item, four factor measure reported by McCroskey, Richmond and Daly (91) was used to assess the four dimensions of homophily-heterophily. These dimensions were labeled: attitude, appearance, background and value-belief.

Power: An instrument composed of four items (one factpr) utilized by Lashbrook (82) was used to measur perceived power-influence of group members.

Quality: A five item (one factor) measure was developed for this study to measure the perceived quality of member contributions. Items were based upon previous descriptions (eg., 40,70,114).

Listening: A four item measure (one factor) was used to assess perceived listening. The instrument has previously been reported by Daly (39) and was based upon previous descriptions (40).

Understanding: A five item (one factor) measure was used to measure perceived understanding. This instrument has been used previously in some related research (39).

Manipulation Checks:

Time: A four item (one factor) instrument was constructed for this study to measure the perceived amount of time pressure felt in the two settings. The instrument was developed according to the descriptions provided by many of the studies cited in the literature review concerning time pressure (eg., 103,111).

Salience: A five item (factored as one factor) measure developed by Weidman (141) was selected to assess the perceived salience of the discussion.

Procedures:

The experiment was conducted within the confines of established classes. All classes had previously been exposed to group discussion and were assigned randomly to time conditions. Instructors were asked toplace subjects in groups randomly and if possible to create as many five member groups as feasible. When all five member group arrangements proved impossible they were told to place students in the best combination of three, four or five member groups. The over-riding concern was that every student be included. Towards that end, group size was manipulated so that it would balance across the various time conditions. That is, an attempt was made to insure that the variance attributable to group size was included in each of the experimental conditions of the research.

After the groups had been formed the instructors distributed 3x5 folded index cards to all students. Each card contained a group number and member number. Subsequent to this instructors distributed the discussion problem to each group member. The discussion topic consisted of a decision making task to which there were five alternatives. The problem was selected so that it would elicit discussion on the part of group members and have an assumed solution time of approximately twenty-five minutes. Subjects were told to read over the problem silently as observers entered the room and took places where they could observe the group. All observers worked in random pairs and were assigned to specific groups immediately before entering the classroom.

While the subjects were reading the problem, one of the observers in each group started a tape recorder that he or she carried into the class. Subjects were told by the instructor that their discussions would be taped. In reality none of the tapes were operational. The only purpose was to add realism and cover for the experiment.

As soon as all the observers were in place and the tape recorders started the class instructor told groups that they could begin

discussion. In the high time pressure setting the instructors immediately turned the timer on and placed it noticably in front of the class.

After the allocated period of time, or in the case of the low pressure groups when they had finished the discussion observers exited the room and classroom instructors distributed the research instrument. Subjects completed one copy of the research instrument for each member of the group excluding themselves. The order of the items on the evaluation pages was counterbalanced to prevent possible response bias.

Statistical Analysis:

The primary statistical analysis for the manipulation checks and the tests of the research hypotheses were 2 x 2 analyses of variances with two levels of time pressure (high and low) and two levels of vocal activity (high and low). The random assignment of subjects with respect to vocal activity was assumed to assure reasonable randomness across groups with respect to time pressure particularly given the operational definition untilized to define levels of vocal activity. and their corresponding effects on the experimental cells. When hypotheses were directional, F values were converted to t values for purposes of ease of computation. Corollary hypotheses were tested by a priori linear comparisons (t-distribution) procedures (45) where the difference between high and low talkers were compared with the same difference under low time pressure. For such comparisons harmonic n's were computed for experimental cells. Analysis based on alternative definitions of vocal activity involved the same procedures since such alternatives were not perceived to involve changes in the research hypotheses. All statistical tests utilized an alpha level of .05. The proportional amount of talk were transformed via an arcsin transformation to assure normality.

Results

Manipulation Checks.

Time: Results indicated that the subjects placed under high time pressure ($\bar{X}$=17.67) felt significantly (t=6.32, $p<.05$) greater time pressure than the low time pressure subjects ($\bar{X}$=9.87).

Salience: It was expected that the longer the group interacted on the topic the more salient it would become for them. Groups provided a longer period of interaction time ($\bar{X}$=15.47) found the problem to be significantly more salient (t=1.69, $p<.05$) than groups with high time pressure ($\bar{X}$=12.33)

For perceptions and salience under each time setting there were no significant differences between high and low talkers or any interactions between vocal activity and time pressure. These results were interpreted as indicating the successful manipulation of the independent variable of time setting.

Tests of Hypotheses:

Hypothesis 1. The analysisof variance showed a significant main effect ($F=10.68, df=1/66, p<.05$) for vocal activity on perceived power-influence. There was no significant main effect for time setting nor was there a significant interaction between time and vocal activity. Low talkers ($\bar{X}=17.15$) were seen as significantly less powerful and influential than were high talkers ($\bar{X}=19.82$).

The mean difference between high and low talkers under high time pressure ($\bar{X}_d=2.78$) was not different ($t=.25$, $p<.05$) from the mean difference between high and low talkers under low time pressure ($\bar{X}_d=2.57$) although the means were in the direction suggested. Thus the first hypothesis is accepted; the corollary rejected (see Table 2).

Hypothesis 2. The analysis of variance on perceived quality revealed a main effect for vocal activity and no significant interaction or main effect for time setting. Individuals with low vocal activity ($\bar{X}=25.43$) were seen as engaging in significantly low quality interactions ($F=8.80, df=1/66, p<.05$) than the high vocal activity individuals ($\bar{X}=27.85$).

The mean difference between high and low talkers under high time pressure ($\bar{X}_d=2.67$) was not significantly different ($t=.70, p<.05$) from the mean difference between high and low activity individuals under low time pressure ($\bar{X}_d=2.09$) although again the means are in the direction posited. Thus the second hypothesis is accepted; the corollary rejected. Table 3 contains the relevant information.

Hypothesis 3. This hypothesis predicted that there would be a main effect for vocal activity in terms of four dimensions of peer credibility. A summary table of the results can be found in Table 4. Extroversion was the only dimension found to have significant effects ($F=23.93, df=1/66, p<.05$). No significant effects were found for time setting or its interaction with vocal activity on any dimension.

For the corollary hypothesis no support was found. Tables 5 through 8 provide the necessary information. The only significant effect (difference) was in the compusre ratings and this was in the opposite direction of that suggested in the hypothesis.

Hypothesis 4. No support was found for the fourth hypothesis although the means were all in the direction suggested. Task attraction approached significance ($p<.10$). No significant talk by time interactions were observed. Table 9 provides a summary of the relevant information. A significant main effect for time setting on social attraction was found ($F=4.72, df=1/66, p<.05$) such that individuals in the low time setting ($\bar{X}=26.52$) were found significantly more socially attractive than those in the high time pressure setting ($\bar{X}=24.31$).

The corollary hypothesis received partial support. For the social attraction dimension (see Table 10) the mean difference for high time pressure between high and low talkers was significantly ($t=1.93$, $p<.05$) different from the mean difference between high and low talkers under low time pressure. For task attraction the mean difference (see Table 11) between high and low talkers under high time pressure was significantly different ($t=1.985$, $p<.05$) from the mean difference between high and low talkers under low time pressure. However this difference was not in the direction predicted. For physical attraction there was no significant difference. Table 12 provides the relevant summary information.

Hypothesis 5. Only the value dimension of homophily-heterophily yielded differences that were significant ($p<.05$). For the attitude dimension the obtained difference approached, but did not meet the requisite level of significance ($.05<p<.10$). Table 13 contains the summary information.

In addition there was a significant main effect for time setting on the value dimension of homophily-heterophily. Analysis indicated that individuals in the low time pressure setting were rated significantly more homophilous than those in the high time pressure environment (high $\bar{X}=11.48$; low $\bar{X}=12.41$; $F=6.599$, $df=1/66$, $p<.05$).

Tables 14 through 17 provide the relevant information on the cell means used in examining the corollary hypothesis. There was no effect for attitude homophily (Table 14) or background homophily (Table 17). The mean difference on appearance homophily (Table 15) between high and low talkers under high time pressure was significantly different ($t=2.48$, $p<.05$) from the mean difference between high and low talkers under low time pressure. In addition the mean difference on value homophily (Table 16) between high and low talkers under high time pressure was significantly different from the mean difference for low time pressure between high and low talkers.

Hypothesis 6. Results failed to support the hypothesis concerning listening perceptions. High talkers did not differ significantly from low talkers (High $\bar{X}=22.08$; Low $\bar{X}=21.58$, $t=.463$, $p>.05$). The corollary hypothesis also failed to receive any support (Table 18).

Hypothesis 7. This hypothesis also received no support. Individuals with high vocal activity ($\bar{X}=26.72$) did not differ significantly ($t=.373$, $p>.05$) from individuals with low vocal activity ($\bar{X}=26.32$). The corollary hypothesis was not supported as well (Table 19).

An alternative operational definition of vocal activity

An alternative operational definition of vocal activity emerged as a result of the analysis of the data relevant to the project's research. It was noted that some groups clearly had no high or low vocally active individual when compared to the overall levels of the sample. When those groups were dropped a secondary analysis was conducted.

Main effects similar to those found utilizing the primary operational definition of vocal activity were found for perceived power-influence, extroversion and value homophily. In addition, two other dependent

measures were also found to yield significant main effects. Significant effects for vocal activity on attitude homophily were observed such that individuals with high activity ($\bar{X}$=23.37) were rated significantly more dissimilar on attitudes (F=3.27,df=1/44,p<.05) than those with low activity ($\bar{X}$=21.71). In addition a main effect for the appearance dimension was observed such that individuals with high activity ($\bar{X}$=10.63) were seen as significantly more dissimilar on appearance (F=5.87,1/44,p<.05) than low active individuals.

In addition to these main effects for vocal activity, there were a number of significant main effects for the rime setting using this operational definition. Table 21 shows the results of comparisons made for time setting via Scheffe's procedure for comparisons.

A number of interactions between vocal activity and time setting were also indicated with this operational defintioon. These involved quality of contributions, composure, competence, physical attraction and task attractiveness. Table 22 provides relevant data. While all the dependent measures named above yielded a significant interaction via F tests, individual comparisons by Scheffe's procedure revealed only for low talkers on the dimension of social and task attraction were there statistically significant differences.

The corollary predictions were also tested via linear contrasts utilizing the dispersion operationalization. No significant differences were found between the mean difference of high and low talkers under high time pressure and low time pressure. This indicates no support for the hypothesized differences with this operational definition.

Conclusions

A number of the hypotheses suggested in this study were partially supported.

The first hypothesis dealt with the perceived power-influence of individual group members given different levels of vocal activity. The results clearly indicated that individuals with high levels of activity were perceived as significantly more powerful and influential than were those with low vocal activity. This finding replicates a number of other research efforts that dealt with the same variable but in different contexts (eg., 41, 131, 142). The corollary of the first hypothesis was not supported. One might conclude that the relationship between vocal activity and perceived pwoer does not change given varying time intervals.

The second hypothesis dealt with the perceived quality of contributions made by different group members. As predicted individuals with high levels of vocal activity were found to be ranked significantly higher on perceived quality of contributions than were those with low vocal activity. This result is supported by work recently reported (40) as well as earlier efforts (70, 114). However there was no support for the corolary prediction to the hypothesis using the primary operationalization of vocal activity. While such a finding

was disappointing, one possible explanation might have to do with the nature of the topic discussed by the groups. It is possible that most groups completed work, or at least completed the decision making process before the low talkers had a real chance to interact. This would explain the main effect for activity and lack of either significant differences between time settings or significant interactions between level of activity and time setting. Another interpretation might be that quality attributions don't change regardless of the time allocated.

The third hypothesis dealt with the perceived peer credibility of different group members given varying levels of activity. In effect this hypothesis was intended to replicate the work reported by Daly, McCroskey and Richmond (41) which found significant relationships between activity and four of the dimensions of peer credibility: extroversion, sociability, composure and competence. Contrary to expectations, only the extroversion dimension was significantly affected by level of activity. Individuals with low vocal activity were rated significantly lower on perceived extroversion than those with high vocal activity. This findings is not surprising since extroversion and vocal activity are very similar conceptually.

Examination of the findings for the corollary hypothesis indicated no support for the predicted relationships. Indeed the only dimension to have significant differences (composure) was in the direction opposite to that predicted. These findings again indicated that judgements made on the basis of vocal activity are either unrelated to the dimensions of credibility or tend not to change over time.

The fourth hypothesis suggested that individuals with high levels of vocal activity would be judged more interpersonally attractive than would those with low activity. No support was found for this hypothesis using the primary operational definition of high and low activity although the results on the task dimension did approach significance. The corollary hypothesis was supported for perceived social attraction. Individuals tended to find other group members with low vocal activity as significantly more socially attractive than those with high vocal activity under low time pressure. This relationship was opposite, as predicted under high time pressure. No support for the corollary hypothesis concerning task and physical attraction was found.

The general lack of findings for the interpersonal attraction dimension is disappointing especially in light of the large bulk of research that indicates a strong relationship between activity and interpersonal liking (eg., 131) as well as research that indicates strong relationships between activity and these specific dimensions of attraction (eg., 41).

The fifth hypothesis indicated that individuals with large amounts of vocal activity would be rated significantly different on dimensions of perceived homophily-heterophily than those with low vocal activity. Only the results for the value dimension were found to support this hypothesis. The alternate defintion that excluded all groups that had no high and low talker also revealed main effects for the value dimension; but in addition, main effects were found for

the dimensions of appearance and attitude homophily.

The corollary hypothesis received limited support. Using the primary operational definition the only dimension found to be significant were value and appearance. The difference for appearance homophily indicated greater differentiation under low time pressure such that low talkers were rated much lower in comparison to high talkers than they were under high time pressure. For the value dimension the converse was observed. Low talkers under high pressure were rated much lower than high talkers while under low time pressure conditions there were minimal differences.

The sixth hypothesis concerned the perceived listening of group members. It was predicted that individuals with high frequencies of interaction would be perceived significantly lower on listening then those with low levels of interaction. No support was found for such expectations. The corollary to the hypothesis was not supported either. This finding is surprising given previous research (eg., 40) as well as the common expectation that individuals who aren't talking in interactions ought to be listening.

The seventh hypothesis in effect should have results similar to those observed in the sixth hypothesis. One would be hard pressed to explain any findings on perceived listening if there were not significant differences on perceived understanding and vice versa. Analysis of the results indicated that there were no differences between high and low talkers. The corollary hypothesis was not supported.

There were some additional findings that merit some attention. They concern the effects of time. When there was less pressure to complete the problem (i.e., groups could take as long as they desired) perceived salience of the problem, social attraction and value homophily increased. Using an alternative definition of activity, attitude homophily, perceived quality and listening as well as task attraction became more positive with more time.

At the same time there were a number of limitations that should be mentioned since they may explain the lack of significant results. For one, the study suffered from a relatively small sample of subjects (n=133). The size was even further restricted by the demands of the operational definitions of vocal activity. For example, the primary operational definition dropped all those who were neither high nor low in vocal acyivity. This resulted in a sample size that was approximately half that of the original sample. Indeed all of the operational definitions considered demanded some reduction in cell sizes. This problem was further exacerbated given the number of experimental cells.

These small samples may lead to concern about the study's lack of statistical power. It is possiblethat some useful and stable relationships appeared insignificant due to insignificant power (see for example, 66, p.333).

Many of the dependent measures used had been previously tested and manipulated in experimental settings. However, the relative length

of the measuring instrument might have resulted in the lack of significant findings. This was especially so with five member groups. Subjects here were required to complete the instrument fourtimes and when presented with the packet we can only suggest gross marking behavior on their part. This problem would probably become worse towards the end of the instrument. The order of measurement was counterbalanced throughout each packet in order to prevent some of the biasing; yet the fatigue factor must still be considered.

Another problem associated with the dependent measures deals with conceptualization. This applies especially to the dimensions of homophily-heterophily. What is the good, favorable or highest direction on any of these dimensions? Within the context of this study the answer is unknown. The only interpretation that one might make would deal with the amounts of perceived similarity-dissimilarity that occurs between individuals goven different levels of vocal activity and different time settings. Whether it is better to be homophilous, heterophilous or somewhere in between in the situations that were used in this experiment is unknown. This criticism of homophily might also apply to the dimensions of peer credibility, interpersonal attraction, power, listening and understanding. The higher one is on any of these dimensions does not necessarily imply greater favorability.

A number of specific remarks should be made about the independent variables in the study. The first concerns the relative variance associated with vocal activity patterns of individuals. It has been assumed that individuals will not vary their activity greatly. Such an assumption is probably justified over a long period of time given the verified consistency in activity. It is possible, however, that an individual who is a high talker at the beginning of a discussion may quiet down measurably later in the short session. It would have been advisable to measure vocal activity in terms of its' maintenance across consecutive periods of observation.

A second problem associated with the concept of vocal activity is the derivation of its operational definition. In this study and in most other studies on this topic, vocal activity has been seen as the frequency and/or duration of interaction. Not included are a large number of other paralinguistic cues or chronemic variables. Work by researchers such as Pope and Siegman and their associates as well as some of the work by Jaffee and Feldstein conceived of the concept in terms of other predicates. For example, speaking rates may have a great deal of effect on how an individual is perceived by others. Work on latency of response by Willard and Strodtbeck (142) indicates that this may be profitably included in future definitions.

Another problem was suggested by the fact that many of the groups that were observed in this study had either no high or low talkers. In other words members of these groups may not have had the opportunityity to make comparisons. Utilizing the operational definition that stressed dispersion avoided this problem although the sample size decreased further.

Another serious limitation is the choice of subjects. Individuals involved in communication courses face an implicit, if not often explicit demand for communication. The interaction patterns observed may have been artifically inflated due tc these supposed demands. In addition subjects knew one another prior to the experiment. Consequently interpersonal judgements may have already been made. Thus the findings of no difference is not surprising as it would have been had the subjects never seen one another previous to the experiment.

Small group researchers suffer from an immense problem in actually controlling for all sources of extraneous variation while at the same time allowing enough realism to be able to generalize past the experiment. In this study, it is highly likely that any number of extraneous effects became confounding. For example, utilizing in-class discussions removed much of the unreality of the experiment but at the same time probably resulted in the problem of people already knowing one another when they interacted. In addition, having other groups interacting within the vicinity of one group allowed for many different problems. Individuals in one group migth compare their work with individuals in other groups. Additionally they might listen to another group instead of their own, joke between one another, and lose touch with the nature of the group and thus the intent of the study.

Future research should attempt to control some of the factors mentioned above. Some of them are endemic to the research process; others are more specifically related to this research attempt.

Research in vocal activity must also deal with the predictors of talking. Previous research for the most part has been limited to examination of the manipulation or consequences of activity. Yet one's initial attractiveness, credibility or power may affect the amount of talk directed towards you or in your presence. In addition obvious research problems center on some theoretic bases for the massive amount of research currently accumulated in this area. Possibly approaches such as those suggested by Berger and his colleagues, Zajonc and Schacter might fulfill some of this need. But more likely some general defintion of communication motivations should explicitly include vocal activity. In a sense it represents the approach continuum onthe approach-avoidance model. It certainly is relevant to topic such as communication apprehension, embarrassment and interaction proneness.

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Table 1

Necessary Scoring Values for
Classification on Vocal Activity

Group Size	Expected Frequency p.	High	Low
3	.33	.495	.165
4	.25	.333	.167
5	.20	.250	.150

Table 2

Means of Experimental Cells for Power-Influence

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	19.76 (n=14)	16.98 (n=16)
Low Time Pressure	19.86 (n=21)	17.29 (n=20)

Table 3

Means of Experimental Cells for Quality

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	27.27 (n=14)	24.60 (n=16)
Low Time Pressure	28.21 (n=21)	26.12 (n=20)

Table 4

Summary Table for Peer Credibility

Dimension	High	Low	t	p
Competence	20.50	20.19	.492	$>.05$
Extroversion	20.50	16.39	4.789	$<.05$
Sociability	23.19	22.35	.906	$>.05$
Composure	21.35	20.19	.500	$>.05$

Table 5

Means for Experimental Cells for Perceived Competence

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	20.80 (n=14)	20.80 (n=16)
Low Time Pressure	20.30 (n=21)	19.68 (n=20)

Table 6

Means for Experimental Cells for Perceived Extroversion

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	20.30 (n=14)	15.99 (n=16)
Low Time Pressure	20.64 (n=21)	16.72 (n=20)

Table 7

Means for Experimental Cells for Perceived Sociability

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	22.51 (n=14)	22.18 (n=16)
Low Time Pressure	23.64 (n=21)	22.48 (n=20)

Table 8

Means for Experimental Cells for Perceived Composure

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	21.14 (n=14)	21.13 (n=16)
Low Time Pressure	21.48 (n=21)	20.81 (n=20)

Table 9

Summary Table for Interpersonal Attraction

Dimension	High	Low	t	p
Social	26.13	25.02	.975	>.05
Physical	23.87	22.97	.732	>.05
Task	28.05	26.36	1.514	<.10

Table 10

Summary of Experimental Cells for Social Attraction

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	24.75 (n=14)	23.93 (n=16)
Low Time Pressure	25.94 (n=21)	27.05 (n=20)

Table 11

Means for Experimental Cells for Task Attraction

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	26.97 (n=14)	26.44 (n=16)
Low Time Pressure	28.78 (n=21)	26.29 (n=20)

Table 12

Means for Experimental Cells for Physical Attraction

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	22.57 (n=14)	22.82 (n=16)
Low Time Pressure	24.74 (n=21)	23.10 (n=20)

Table 13

Summary Table for Homophily

Dimension	High	Low	t	p
Attitude	24.02	22.24	1.64	<.10
Appearance	10.63	10.31	.32	>.05
Value	12.34	11.69	1.95	<.05
Background	21.95	22.07	.19	>.05

Table 14

Means for Experimental Cells for Attitude Homophily

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	23.06(n=14)	21.68(n=16)
Low Time Pressure	24.67(n=21)	22.70(n=20)

Table 15

Means for Experimental Cells for Appearance Homophily

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	10.34(n=14)	10.99(n=16)
Low Time Pressure	10.83(n=21)	9.74(n=20)

Table 16

Means for Experimental Cells for Value Homophily

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	12.11(n=14)	10.94(n=16)
Low Time Pressure	12.50(n=21)	12.32(n=20)

Table 17

Means for Experimental Cells for Background Homophily

Setting	High Vocal Activity	Low Vocal Activity
High Vocal Activity	21.51(n=14)	21.55(n=16)
Low Vocal Activity	22.24(n=21)	22.53(n=20)

Table 18

Means for Experimental Cells for Perceived Listening

Setting	High Vocal Activity	Low Vocal Activity
High Vocal Activity	21.67(n=14)	21.50(n=16)
Low Vocal Activity	22.37(n=21)	21.76(n=20)

Table 19

Means for Experimental Cells for Perceived Understanding

Setting	High Vocal Activity	Low Vocal Activity
High Time Pressure	26.38(n=14)	26.48(n=16)
Low Time Pressure	26.95(n=21)	26.20(n=20)

Table 20

Means for the Interaction of Rater and Ratee for Attitude Homophily

Ratee Vocal Activity	Rater Vocal Activity	
	High	Low
High	22.98	20.79
Low	23.04	25.67

Table 21

Summary Table for Time Setting Effects Using the Dispersion Operational Definition

Dependent Measure	Low Pressure	High Pressure	md	p
Attitude Homophily	24.51	20.57	3.94	<.05
Quality	27.54	25.02	2.52	<.05
Task Attraction	28.04	24.80	3.24	<.05
Listening	22.69	20.19	2.50	<.05

Table 22

Summary of Data for Analysis of Interactions Using the Dispersion Operational Definition

Dependent Measure	High Vocal Act. High Time Pres.	High Vocal Act. Low Time Pres.	Low Vocal Act. High Time Pre.	Low Vocal Low Time
Quality	25.63	25.71	24.40	29.37
Composure	21.44	21.07	19.18	21.30
Competence	21.13	19.74	19.06	21.12
Social Att.	24.25	25.46	21.49	28.65
Task Attrac.	25.66	25.99	23.93	30.08
Physical Att.	22.58	21.74	20.90	25.58